UNITED STATES DEPARTMENT OF AGRICULTURE
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M O N T H L Y N E W S L E T T E R

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All employees are reminded that under the provisions of Secretary's memorandum 480, dated April 28, 1924, questionnaires designed to develop information for official use must, before distribution, be approved by the Secretary's Office. When submitting a questionnaire for approval, it should be accompanied by a statement showing the purpose of and necessity for the questionnaire, how many are to be circularized and to what groups, and that the information can not be obtained otherwise.

The Agricultural appropriation bill as reported to the House carries $39,800 for administrative expenses and $478,890 for Agricultural Engineering investigations, making a total of $518,690, which is a reduction of $65,150 from the appropriation for the present fiscal year.

Five members of this Bureau will attend the meeting of the Association of Southern Agricultural Workers at Birmingham, Ala. Their names and the subjects of the papers which they will present are as follows: R. B. Gray, Cooperative work pertaining to farm machinery in the South; S.P. Lyle, Engineering adjustments for Southern farms; C. A. Bennett, Cotton drying and ginning; J. W. Randolph, Measuring power units in the field and laboratory; and G. A. Cumings, Cooperative fertilizer placement tests with cotton in seven States. Mr. Cumings' paper will be delivered before the agronomy section; the others will be given in the Agricultural Engineering section.

S. P. Lyle en route to Birmingham, Ala. expects to make stops in South Carolina, Georgia and Alabama in connection with his work in agricultural engineering extension.

George R. Boyd visited N.A. Kessler at St. Paul to inspect the work in farm land development, and then at Quincy, Ill. conferred with J. G. Sutton in regard to the study of drainage district rehabilitation.

He will also visit O. M. Page at Cairo, Ill. in connection with the work for the War Department in appraising land involved in the Mississippi Levee improvements.

W. V. Hukill is at Wenatchee, Wash. waiting for cold weather which will permit him to make a test run of fruits across the northern tier of States.

L. M. Winsor rendered assistance to a colony of settlers at Pomerene, Ariz., where floods during the summer of 1931 had destroyed a diversion dam and the upper portion of the canal. The concrete weir resting upon steel sheet piling was destroyed, as a result of which the Benson Canal Co., owners, was thrown into bankruptcy. Bonds of $30,000 remain outstanding against the structure and the principal stockholders, who are non-resident landowners, refuse to make any further effort to replace the headworks. A detailed study of physical conditions led to the conclusion that by labor alone a temporary diversion system could be installed, sufficient for the needs of 1932; and that by labor alone the canal might be extended during 1932 to a location where a more efficient diversion system could be installed, which would be superior to the one destroyed because the entire low water supply might be diverted by gravity, whereas under former system the mid-summer flow had to be pumped from the stream bed under the diversion dam which was not tight. It was also estimated that during 1932 the colony would be able to build a permanent diversion weir by the use of materials at hand plus a very small outlay in cash for cement. In this way it was concluded that the system might be rebuilt without the necessity of floating more bonds or of going into debt. A mass meeting was called and the plan was presented and unanimously accepted.

Leslie Bowen was transferred December 9 from Bonners Ferry, Ida., to Yakima, Wash. to assist Mr. Jessup on soil moisture computations in connection with the Kootenai River investigation. During the past season some 2,500 soil samples were taken in the field, and the computations to convert these data into form for use in a report are now being made.

Arch Work reports that pruning of the orchard on the Medford experiment tract project will soon be completed. A road 1,100 feet long into the building site, was cleared, and was graded with county machinery. The road is now ready for gravelling. Building corners were staked and the site cleared. Final plans for the financing of the buildings have been completed, and it is expected that the contract will be let as soon as completed by the district attorney. All specifications for the cottage, laboratory, implement shed, water supply and sewage disposal and road work are complete.

J. H. McCormick reports concerning experimental work at Bard, Calif., that results from second-year alfalfa confirms the observations made by him last November relative to the improbability of showing a measurable

consumptive use during the winter season on this station. After allowing for 0.62 inch of rain, samples taken on December 20 actually contained 0.17 inch more water to a depth of six feet than on Dec. 2. In other words the discrepancy due to experimental error was greater than the loss of moisture from the soil during this period. Mr. McCormick also states that contrary to local belief that there is little or no root activity below the depth of the silt blanket (which averages about 12 inches in this soil type), moisture samples showed an appreciable deficiency in the fourth and fifth foot on old alfalfa plots which had received no irrigation between September 1 and December 21. Sands with field capacities ranging from 12 to 5 per cent comprise the subsoil beneath the silt.

Colin A. Taylor reports some interesting features along the line of improved methods of recording widely varying stream flow; recording stream flow in second-feet instead of gage height; determination of moisture content; and reducing the starting time for the growth of samples in the wilting point laboratory. Mr. Taylor states that two new controls at Devil Canyon, Calif., were completed and operated satisfactorily through the December storms. Experiments were conducted on a flow recorder attachment whereby the record is indicated in second-feet instead of gage height. The large Toledo scale was fitted with a chart so that moisture content is indicated directly by the pointer on the scale. The 300 samples in the wilting point laboratory are growing uniformly and rapidly with the aid of artificial light and heat. These samples are tested to determine the per cent of moisture in the soil necessary to support plant life. Starting time on this series was reduced by sprouting the seeds under blotting paper and selecting seeds as they just broke the seed pod and then planting them in the cans.

O. A. Faris made a trip to the Lower Rio Grande Valley for the purpose of inspecting canal lining and distribution of silt in the canal systems. The canal lining in the valley consists of hand-placed concrete 1 1/2 to 2 inches in thickness and gunite 1 inch in thickness. Four by eight No. 14, six by eight No. 12 and possibly other spacing and sizes of wire reinforcing are used in both types. Some of the lining, especially the hand-placed concrete, is provided with expansion joints spaced from 10 to 12 feet, these joints being simply a space between the slabs filled with hot tarvia or asphalt. At the time of Mr. Faris' inspection, the asphalt filler was pulled away from contact with one of the slabs at several joints which were observed. In porous material, this might result in considerable loss of water, but in clay or silty material, especially where the water carries some silt, it is believed that cracks soon become sealed. Stains on pieces of cracked gunite indicated that silt enters the hair cracks 3/4 inch. For gunite lining without expansion cracks or joints, there were from 8 to 64 transverse shrinkage cracks per 100 feet. Some of the hand-placed concrete had longitudinal cracks. When no expansion joints were provided, transverse cracks seemed to be as numerous in concrete as in gunite lining. When expansion joints were provided at 12 feet intervals, transverse hair cracks were noticeable in every fourth or fifth slab.

M. R. Lewis delivered a paper on "Irrigation in the Willamette Valley with Special Reference to the Problems of the Nut Grower" at Eugene before the Western Nut Growers Association, on December 2. On December 11 he delivered a paper on "Soil Moisture Control" at Hood River before the Oregon State Horticultural Society. Mr. Lewis also delivered radio talks on centrifugal deep well pumps over K O A C on December 2 and 16. A report on the drainage problem of the Laguna de Santa Rosa, in California, was completed by Mr. Lewis during the month.

Carl Rohwer completed a report on Evaporation from Salt Solutions and from Oil-covered Water Surfaces. The observations covered by this report show that the evaporation is reduced by the presence of an oil film on the water surface, and that the amount of the reduction increases with the thickness of the oil film, but the short time which the oil film is effective in reducing the evaporation due to dissipation by rainfall, wind, and other causes, indicates that this method is not economically feasible for reducing the evaporation from large water surfaces.

J. C. Marr, in cooperation with Professor Kulp of the University of Idaho, is working up pump tests and related data, procured during the past year, into a progress report.

L. T. Jessup spent about a week at Bonners Ferry, Idaho, taking soil moisture samples in evapo-transpiration tanks; making final tests on specific yield and moisture-holding capacity experiments; tested these samples for moisture; and procured samples of grain of various grades to be used in grading the grain samples taken last fall.

Dean C. Muckel, in connection with his assignment to assist Mr. Mitchelson on the water-spreading project in southern California visited several water spreading grounds, of outside agencies, including the San Bernardino and Santa Ana River plots. For the first time in three years there was sufficient water to spread on the Santa Ana River grounds. Due to recent torrential rains, however, the water was very muddy and only the lower basin was being used, the plan being to use the upper basins for clear water only and to use the lower basin when the water is muddy and there is danger of silting the grounds.

C. E. Ramser has submitted the following items regarding the soil erosion experiment farms:

H. S. Riesbol reports an annual rainfall of 27 inches at Guthrie for the calendar year 1931, which is 5 inches less than the normal annual rainfall. A total of 8.19 inches of rain fell on the Guthrie soil erosion farm during November 16 to 23, inclusive. Considerable run-off and silt data of value were collected. A silt box with dimensions of 8 by 40 feet and 2 feet deep installed on an unterraced area of about 4 acres was

filled at two different times during this rainy period. Cost records on the Guthrie project indicate that in addition to diminishing crop yields each year on unterraced land, the cost of reclaiming badly eroded and gullied land by terracing is over six times as much as the cost of terracing virgin land before gullies had developed. In connection with farming operations on terraced land it has been found that most farm machinery now being manufactured is not sufficiently flexible to operate satisfactorily over terraces. This fact has been brought to the attention of the machinery manufacturer who apparently will make an effort to modify designs of machinery to meet the requirements for farming terraced land.

H. O. Hill has completed the installation of two Parshall measuring flumes at the lower end of two comparable unterraced plots. On one plot the rows will be run across the slope on the contour and on the other perpendicular to the contours. Measurements will be made to determine the effect upon run-off for the two systems of farming. Later silt sampling devices will be installed below the flumes. Observations to date on the Texas Blackland Soil Erosion Project indicate that the terrace channels fill very rapidly due to erosion between the terraces and that annual maintenance will be required to keep the channels open. An experiment with closed end level terraces designed to retain all of the rainfall indicates that this practice is not suitable for the Blackland Belt due to the fact that the water stands above the terraces so long as to damage the crops. The installation of tile drains above level terraces with closed ends has been completed for an experiment designed to determine the possibility of retaining all water above terraces where tile drainage is practiced.

Mr. Drake reports that a snow storm which occurred during the first part of January stopped all outside work on the Hays Soil Erosion Project and blockaded traffic on the highways and railroads. Measurements of run-off and soil losses from two plots on a slope of about 8 per cent, one of which is subsoiled indicates that there is very little difference in the water and soil losses on subsoiled and unsubsoiled land where the slopes are comparatively steep. Mr. Drake reports that the yields on these two areas were practically the same. However results from this experiment are not yet regarded as conclusive.

A terracing demonstration was held on the Tyler farm in cooperation with the Texas Extension Service on December 14, which was attended by M. R. Bentley, State Extension Agricultural Engineer and A. K. Short, Conservation and Terracing Agent of the Federal Land Bank of Houston, Texas. R. W. Baird reports that a terrace 12 feet wide and 15 inches high was built in 4 rounds with a Caterpillar Fifteen Tractor and Caterpillar grader with 8-foot blade. About $5\frac{1}{2}$ inches of rainfall occurred on the Tyler farm during the first week in January which made possible the collection of considerable data on run-off and soil losses from terraces of different designs.

A. T. Holman reports that some difficulty was encountered with the two-row tractor cultivator due to slipping down the slope and plowing out the crop when operating on the side of a terrace. He suggests that this difficulty could be overcome by a redesign of the tractor to shift some of the weight from the front to the rear, by lowering the center of gravity of the machine and by using properly designed wheels to prevent

side slipping. Observations were made on erosion conditions on two areas that were badly gullied when the farm was taken over. The gullies in one of these areas were protected by means of small sod and woven wire check dams and the other area was protected by terraces. Both areas are farmed alike. Considerable erosion has occurred on the unterraced area while the terraced area is comparatively free from the effects of erosion.

P. C. McGrew reports that where the slope of the land on the Pullman farm varied from 15 to 40 per cent it was necessary to conduct all plowing operations parallel to the terraces. On slopes less than 25 per cent the soil could be thrown to the center of the terrace from both sides but on steeper slopes it was necessary to turn the soil down hill only and return trips were made where possible on flatter slopes, or by circling the hill. Under such conditions a reversible plow could be used to advantage. Another solution would be an implement that would stir the ground thoroughly without turning it over.

R. A. Norton reports that all measuring equipment has been received to complete the original program of engineering experiments for the Clarinda project and if the weather permits he expects to complete all installations before the coming of spring rains. About 10 inches of snow on the Clarinda farm during the first week in January has prevented further work on field installations.

R. B. Gray left Washington January 19 on an extended trip through the Middle West and South in connection with the work in farm machinery investigations. His first stop was at Kansas City, Mo. where he attended the farm machinery exposition. From there he will go to Manhattan, Kans.; Columbia, Mo.; Fayetteville, Ark.; Jeanerett, La.; Albany, Ga.; Auburn, Ala. and Birmingham, Ala.

G. A. Cumings was in Charlotte, North Carolina on January 11, inspecting a special combination cotton planter and fertilizer distributor now being constructed by the Cole Manufacturing Co. under general specifications of this Bureau.

E. M. Mervine, who was in Washington during the month of December attending to matters pertaining to the sugar beet machinery project, including the publication of a report on the 1931 work and the construction of a special beet drill for fertilizer placement studies, left for Fort Collins, Colo. on January 2. Mr. Mervine will proceed to Davis, Calif. where he will continue the work of the project.

A. L. Sharp has been supervising the construction of a special sugar beet drill for fertilizer placement experiments in the Department shops in Washington. The drill has been shipped to Davis, Calif. for use during the planting season which is now in progress.

E. M. Dieffenbach with headquarters at Albany, Ga. is engaged in cooperative spraying investigations with pecan trees. Mr. Dieffenbach reports that proper pruning of the trees would greatly facilitate spraying. Unpruned pecan trees frequently reach a height of seventy-five feet. The great height together with the maze of branches adds greatly to the work of applying insecticides and fungicides.

Walter H. Redit, who has been assisting on the corn borer project for the last two months, reported at Washington January 1 for new duties in connection with the fertilizer project.

Frank Irons, of the South Norwalk office, spent two days at the Toledo office conferring on the corn borer work in the eastern area. An exhibit of corn borer control machinery consisting of corn binder with low-cutting attachment, stalk shavers, plow with covering attachments, and hand cutting devices will be shown at Trenton, New Jersey, during Agricultural Week from January 26 to 29.

An exhibit of corn borer control machinery is being prepared for display during Farmers' Week at Ohio State University February 1 to 5.

M. C. Betts and a force of seven draftsmen have established quarters in Building C at 7th and B Streets, S.W. where they will be located until the plans of buildings for the Bureau of Public Roads, mentioned in previous News Letters, have been completed. John T. Bowen is acting chief of the Division of Plans and Service during Mr. Betts' absence.

This Bureau was called on for advice relative to the removal of the section of a large redwood tree from the grounds of the Agricultural Department to Arlington Farm. This tree was first exhibited at the Columbian exposition, Chicago in 1892 and was later brought to Washington and set up in the agricultural grounds.